

Claims

1. A melt-processable thermoplastic composition comprising:
- 5 c) 50-99.5 wt% of a melt-processable thermoplastic polymer; and
- 10 d) 0.5-50 wt% of a particulate polymer comprising the residues of a monomer mixture comprising 50 - 100 wt% of methyl methacrylate (MMA), at least 0 - 50 wt% of an ethylenically unsaturated comonomer comprising at least one alkyl acrylate or methacrylate and 0 - 10 wt% of a copolymerisable cross-linking monomer, said particles having a maximum dimension of 5 mm.
- 15 2. A composition according to Claim 1, wherein the melt-processable thermoplastic polymer forms a matrix and is of polymethylmethacrylate homopolymer or copolymer derived from a monomer mixture comprising 60 - 100 wt% methyl methacrylate and 0 - 40 wt% of at least one other copolymerisable alkyl acrylate or methacrylate.
- 20 3. A composition according to Claim 1 or Claim 2, wherein said particulate polymer is formed from the residues of a monomer mixture comprising at least 50 wt% methyl methacrylate.
- 25 4. A composition according to Claim 3, wherein said particulate polymer is formed from the residues of a monomer mixture comprising at least 1 wt% of a copolymerisable acrylic comonomer.
- 30

10049604-050002

Sub A1

5. A composition according to Claim 4, wherein said copolymer is an alkyl acrylate.

6. A composition according to any preceding claim, wherein said monomer mixture includes at least 0.1 wt% of a comonomer which is capable of forming cross-linking with the polymer.

7. A composition according to any preceding claim, wherein said particulate polymer is formed from the residues of a monomer mixture comprising 70 - 95 wt% MMA, 5 - 30 wt% of a copolymerisable acrylic comonomer and 0.1 - 5 wt% of a comonomer which is capable of forming cross-linking within the polymer.

8. A composition according to any preceding claim which includes at least 1 wt% and less than 40 wt% of said particulate polymer.

9. A composition according to any preceding claim, wherein the particles of said particulate polymer are of a size such that they could pass through a 500 μm sieve.

10. A composition according to any preceding claim, wherein at least 20 wt% of particles of said particulate polymer are between 60 (250 μm) and 80 (177 μm) mesh.

11. A method of preparing a melt-processable thermoplastic composition, the method comprising contacting:

a) 50-99.5 wt% of a melt-processable thermoplastic polymer; and

Sub A2

10049604-050802

- 5 b) 0.5-50 %wt of a particulate polymer comprising the residues of a monomer mixture comprising 50 - 100 wt% of methyl methacrylate (MMA), at least 0 - 50 wt% of an ethylenically unsaturated comonomer comprising at least one alkyl acrylate or methacrylate and 0 - 10 wt% of a copolymerisable cross-linking monomer, said particles having a maximum dimension of 5 mm.

10 12. A method according to Claim 11, wherein said melt-processable polymer and said particulate polymer are not cast after contact together.

15 13. A method according to Claim 11 or Claim 12, wherein said melt-processable polymer and said particulate polymer are mixed by extrusion under conditions such that particles of said particulate polymer are broken down.

20 14. A method according to any of Claims 11 to 13, wherein said melt-processable polymer and said particulate polymer are not caused to chemically react during said mixing and/or extrusion.

25 15. A method of forming an article which comprises shaping a melt-processable thermoplastic composition according to any of Claims 1 to 10 or as prepared according to any of Claims 11 to 14 in order to form said article.

30 16. A method according to Claim 15, wherein said melt-processable thermoplastic composition is subjected to conditions such that particles of the particulate polymer in said melt-processable thermoplastic composition are broken down.

10049504-050802

Sub A3

17. A method according to Claim 16, wherein said melt-processable thermoplastic composition is subjected to a shear rate of at least $100s^{-1}$.

5 18. A method according to any of Claims 15 to 17, wherein said composition is extruded or co-extruded.

10 19. A method according to any of Claims 15 to 18, wherein said article includes a substrate and a capstock material wherein said capstock material comprises said melt-processable thermoplastic composition.

15 20. A method according to any of Claims 15 to 19, wherein said article is a building component.

20 21. A method according to any of Claims 15 to 20, wherein said article is a component for use in construction and is a co-extruded component comprising a substrate made of PVC, HIPS or ABS and said melt-processable thermoplastic material provided as a capstock thereon.

25 22. A method according to any of Claims 15 to 21, wherein when a surface of the article formed of said thermoplastic composition is tested for impact resistance in accordance with ASTM D4226, the mean failure height is not less than 7.5 inches (19.05 cm).

30 23. An article formed from a thermoplastic composition which comprises a melt-processable thermoplastic polymer and a particulate polymer, wherein the weight averaged diameter of particles of said particulate polymer prior to formation of said article is greater than the diameter after formation of said article.

208050-4096400

Sub A4

24. A method of forming an article which comprises a capstock layer, the method comprising: selecting a melt-processable thermoplastic composition comprising a melt-processable thermoplastic polymer and a particulate polymer wherein some of the particles of the particulate polymer have a diameter of $x \mu\text{m}$; and extruding, preferably co-extruding, said selected composition to form a capstock layer of a thickness less than $x \mu\text{m}$.

10
Sub A

25. An article which includes a substrate and a capstock material prepared from a thermoplastic composition as described in any of Claims 1 to 10 or when prepared in a method according to any of Claims 11 to 22 or 24.

15

26. An article according to any of Claims 19, 21, 24 or 25, wherein said capstock layer or material has a thickness of less than $200 \mu\text{m}$.

20

10049604-050802

Appl A 67